

PATENT SPECIFICATION

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COMPLETE SPECIFICATION.



Small Single Phase Motor with Short Circuited Armature.

We, LANDIS & GYR A. G., of Zug, Canton Zug, Switzerland, a Swiss firm, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

Small single phase motors having a short circuited armature are known in principle, the so-called Ferraris driving mechanism being an example of such a motor, the armature thereof being in the form of a good conducting disc. In order to produce a turning movement in such motors a portion of the flux is periodically displaced in phase in relation to another portion thereof, the periodic phase displacement being obtained by means of short circuiting rings. Motors are known, which are provided with short circuited armatures acting as rotors, as for example in alternating current motors, such armatures being known as squirrel cage armatures. In all these motors, the magnetic pole surfaces are separated from each other by the armature and by two air gaps. This arrangement, however, causes various errors, as the speeds obtained therewith are well below synchronous.

Now the present invention relates to a small single phase motor having a short circuited armature, copper coils on parts only of the magnet pole faces and a ferromagnetic shunt to the magnet poles.

At first sight it would appear that the efficiency of the motor would be reduced by reason of an increase in flux leakage. Experiments, however, have shown that this ferromagnetic shunt increases the periodic displacement of one partial flux, which is produced by the provision of the above mentioned short circuiting rings, whilst the rotating field, which is partly formed, becomes more compact.

The design of the motor in order to

obtain the ferromagnetic shunt may take various forms. The drawing shows diagrammatically two examples of construction.

In the example of construction according to Fig. 1 the stator 1 of the motor has the pole shoes 2, each of which is provided with a short circuiting ring 3. 4 is the short circuited armature of the motor and 7 the stator winding. The pole shoes 2 are connected together above and below the short circuited armature by bridges 5 of magnetic good conducting material, these bridges forming the ferromagnetic shunt across the armature 4.

In the example of construction according to Fig. 2 the pole shoes 2 almost completely surround the short circuited armature 4 in that above and below the armature they approach one another and are only separated by a narrow air gap 6. In this manner a ferro-magnetic shunt bridging the air gap is obtained, whereby the dimensions of this air gap may be chosen in accordance with the most favourable conditions for obtaining this ferro-magnetic shunt.

The provision of the air gap 6 enables a relay or braking action to be obtained, in that an armature is disposed above the stator to one side, which, when switching on the motor, is drawn against the stator and thus bridging the air gap 6 produces the ferro-magnetic shunt through itself. As there is a magnetic potential between the pole shoes, magnetic energy exists in the air gap 6. If a movable armature is brought into the field of the gap 6 the armature will be moved in such a manner as to reduce the magnetic energy to a minimum, in other words the armature is attracted towards the air gap. This movement may be used for braking purposes. For this purpose the armature is combined with a brake which comes into action when the motor is switched out

and quickly stops the motor. The armature is movably mounted on a shaft and is released by a spring when the pole shoes are deenergised. In order to prevent the armature from clinging to the stator a so called adhesion pin is provided which is adapted to prevent the armature from bearing flat against the stator iron.

In this relay arrangement the lower air gap 6 may also be omitted and the stator forms a closed entity underneath the short circuiting armature 4.

If no relay action is required, the upper air gap 6 may also be omitted so that the stator is closed around the armature 4. In this case the separate laminations, of which the stator is composed, may each consist of one piece, or, in order to permit of easy application of the stator coil 7, they may each be formed of two symmetrical parts, which are brought together at a butt joint when erecting the motor.

Instead of only a single short circuiting ring 3 a number of such rings may be provided.

In induction motors and meters of the disc type it has been suggested previously to provide loops in which currents are induced for the purpose of producing a phase displacement between the fluxes in the pole face pieces by adjusting the position of a screw, whilst a hinged pallet is also provided, adapted to act as a brake for the rotor.

Suggestions have also been made previously to use ferro-magnetic shunts in

induction motors and meters. Such arrangements however are not claimed *per se*.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Small single phase motor having short circuited armature, copper coils encircling parts only of the magnet pole faces, and a ferro-magnetic shunt to the magnet poles.

2. Small single phase motor according to Claim 1, characterised by the fact that the ferro-magnetic shunt is obtained by bridges which connect together pole shoes of the stator.

3. Small single phase motor according to Claim 1, characterised by the fact that for obtaining the ferro-magnetic shunt the ends of pole shoes of the stator are brought near to one another above and below the short circuited armature so as to leave a narrow air gap.

4. Small single phase motor as claimed in Claim 1, characterised by the fact that the stator is closed around the short circuited armature.

5. Small single phase motor with short circuited armature substantially as described in connection with the accompanying drawings.

Dated this 28th day of February, 1924.

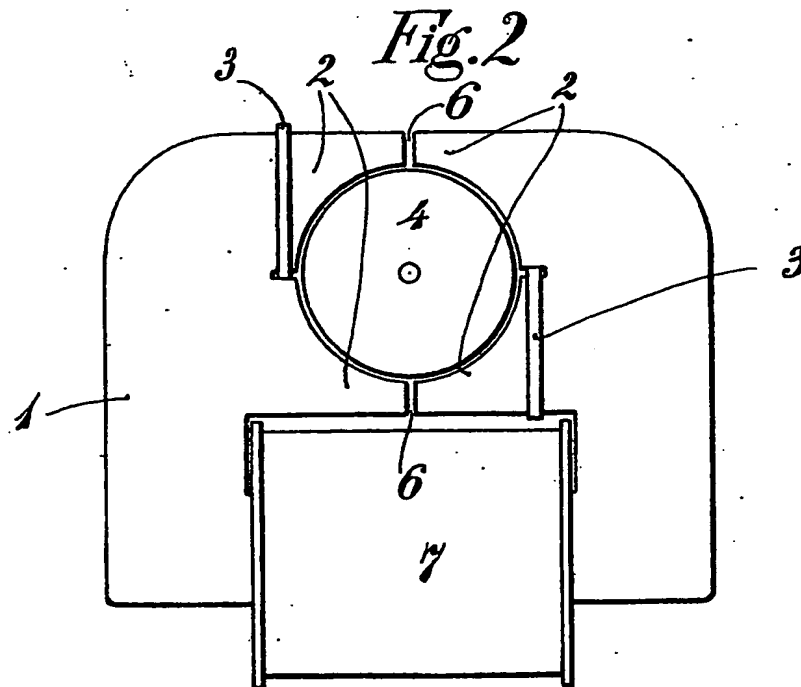
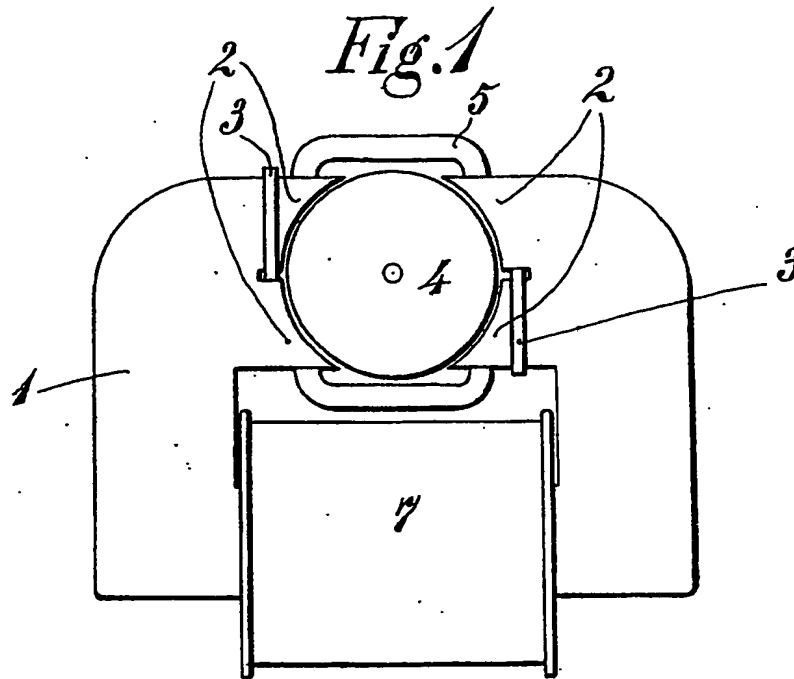
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